Recommended High Hit Factors and Classification System Updates

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Executive Summary

The USPSA Classifier Committee's charter is to review and update High Hit Factors (HHFs), evaluate Classification System performance, develop classifier stages, and provide reports and relevant documentation. The purpose of the Classification System is to provide USPSA members with a standardized framework to measure, test, and compare their shooting skills to a national standard at Level I matches. With over 39 thousand current members, and several thousand scores on average per division per classifier stage, the depth of the data enables substantial statistical analysis of shooting performance and skill ranking.

To create a statistically robust, mathematically repeatable, and competitively equitable USPSA Classification System, the Classifier Committee recommends the following comprehensive updates:

1. Standardized algorithmic HHF calibration using Weibull statistical distribution with Percentile Targeting
2. Removal of B, C, and G flags
3. Modification of D flag logic, where
    - Same-day scores are averaged into a single score *(Same Day Average or SDA Flag)*
    - Different-day scores use the latest attempt instead of the best one *(Most Recent Override or MRO flag)*
4. Raising Score Ceiling from 100% to 110% of HHF
5. Classifier List Reduction
6. Temporary hold period for Limited-10 classifier scores
7. Unchanged Classification Percentage Brackets (95% GM, 85% M, etc)
8. Unchanged Classification Active Window (minimum of 4, best 6 out of recent 8)

The proposed Classification System updates were calibrated using software tools developed by the Classifier Committee with the following key metrics:

1. Maximizing the correlation between Classification Percentage and Major Match Elo rating
2. Resulting in the same number of Overall Grandmasters in the Carry Optics division
3. Minimizing the total number of changes to the existing system

With this approach, the Classification System reliably represents members' skill levels based on consistent performance rather than isolated peak moments. The proposed method removes subjectivity, ensures uniformity across divisions and stages, and avoids bias toward outliers.

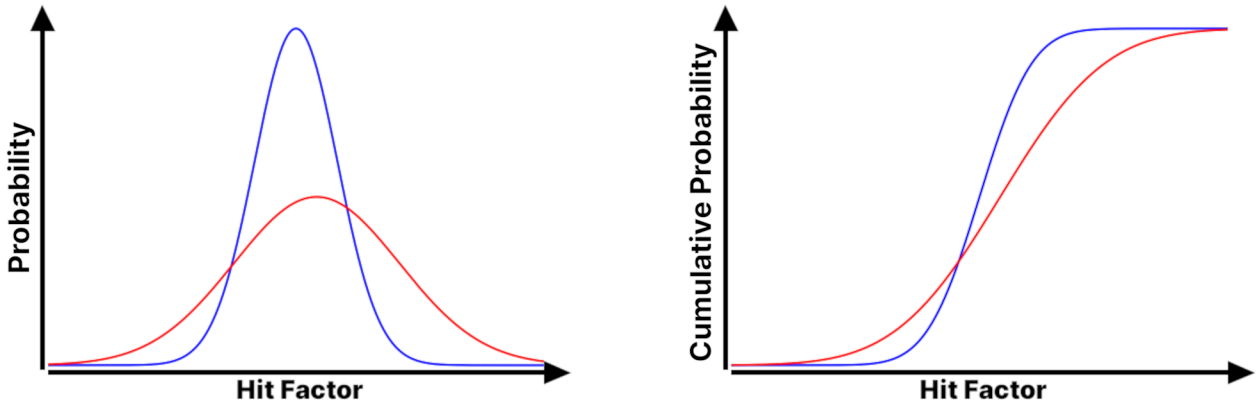
1 Introduction

Shortly after the release of the 24-series classifiers, it became apparent that the existing HHF calculation methodology was suboptimal. This issue became especially evident at the 2024 USPSA Open & PCC National Championship, where no competitors—not even podium finishers—could achieve Grandmaster scores in Open. This led to the creation of the USPSA Classifier Committee, whose charter is to review and update HHFs, evaluate Classification System performance, develop and evaluate classifier stages, and provide reports and documentation. Its initial priority was to fix the HHFs for the 23- and 24-series, which required a deeper examination of the Classification System.

Because of that, the Classifier Committee prioritized tuning the Classification System with the existing stages to reflect the skills, performance, and consistency required for success at Major Matches. Classification should reflect consistent match performance rather than extreme, one-time peaks or "Hero-or-Zero" moments. With 100 active stages, eight divisions, and decades of shooting history, USPSA has 1.4 million scores available for analysis. This extensive dataset enables detailed analytics for improving the Classification System and other related metrics.

1.1 Performance Bell Curve

Shooting performance falls on a bell curve for both an individual and for a population. Whenever a competitor shoots a stage, they are most likely to shoot the stage close to their average, typical performance. The likelihood of shooting the stage significantly better than they usually would is low; and similarly, the possibility of zeroing the stage is also low. This is represented by the blue curve in Figure 1a below. If competitors push themselves beyond their normal abilities, their likelihood of achieving higher scores increases, as does their score standard deviation. However, this approach also increases their risk of zeroing the stage. This is represented by the red curve. Figure 1b is called the Cumulative Density Function, which measures the possibility of getting that Hit Factor score or lower for an individual competitor.



(a) Probability Density Function (PDF)

(b) Cumulative Density Function (CDF)

Figure 1: Performance Bell Curve - Regular Performance (Blue), "Hero-or-Zero" (Red)

The same concept of the performance bell curve applies not only to the individual competitor but also to the entire membership as a whole. Skill is distributed normally, with the most members split between B- and C-classes. As shooting skills and match competitive skills increase, the number of athletes at that skill level decreases exponentially. At the very top, there are usually only a small handful of dominant competitors in the sport that, even still, are significantly better than the Top 10 at Nationals. Classification makes sense to be evaluated compared to the Top X% of active competitors at any given time instead of the absolute limits of human performance.

Using the scores recorded for a given stage, the skill distribution for the membership can be evaluated and an HHF can be found. The CDF of stage scores allows us to look at the performance distribution of everyone who has shot it. In the case of the Practical Shooting sport, the Weibull distribution is the best statistical distribution type to describe the dataset. The data is close to a Normal or Gaussian distribution with a short tail at high skill.

2 Research Process Overview

The research to optimize the Classification System went through multiple steps and iterations, which were further improved after the formation of the USPSA Classifier Committee. The first step after obtaining classifier scores was to plot the CDF, where the X-coordinate equals the Hit Factor, and the Y-coordinate equals the score's percentile. We then observed that the resulting chart closely resembled a CDF of the Weibull distribution. Based on these charts and previous USPSA competitor knowledge, we selected the 20-01 "Wish You Were Here" stage in the Carry Optics division as our initial golden standard for difficulty and population distribution. This standard revealed the following "ideal" distribution targets for higher classifications:

- 99th Percentile = Grandmasters (95%)
- 95th Percentile = Masters (85%) or better
- 85th Percentile = A-class (75%) or better

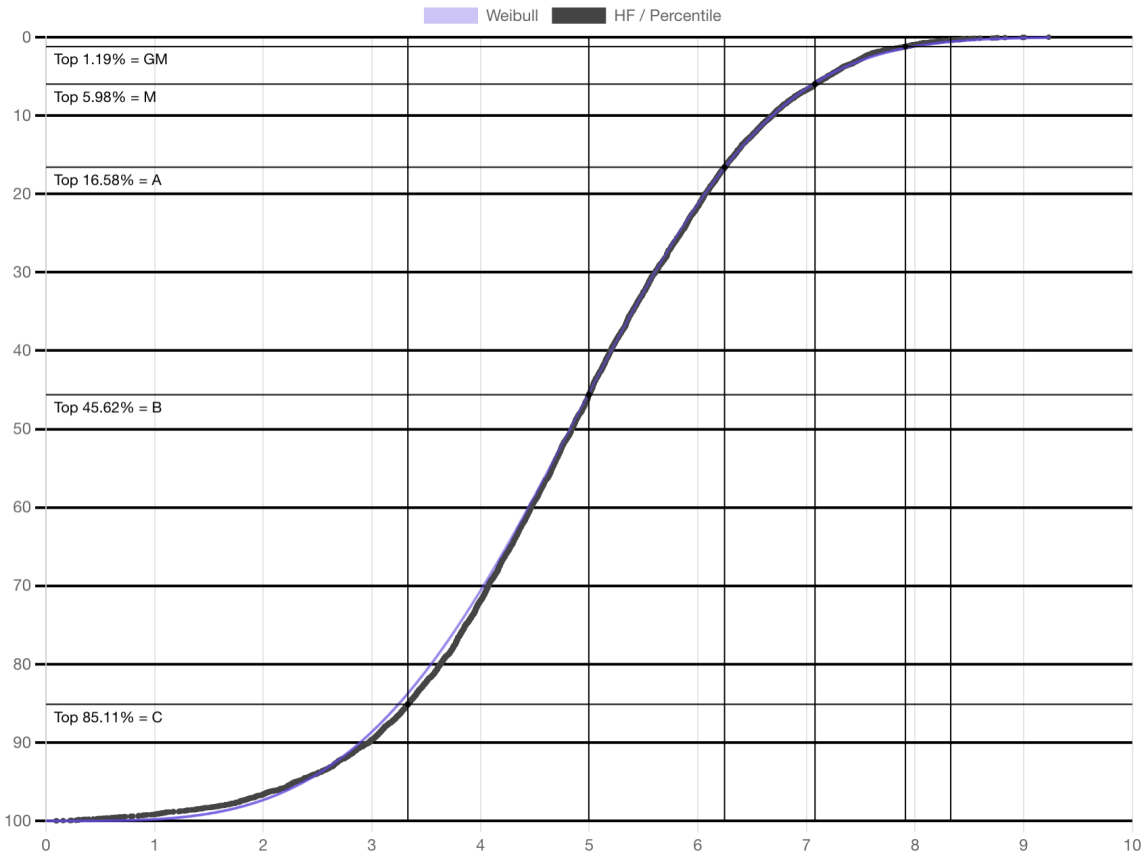


Figure 2: 20-01 "Wish You Were Here" Carry Optics Scores Distribution

As shown in Figure 2, the real-life data ended up very close to the theoretical Weibull distribution (thinner purple line). For 20-01 "Wish You Were Here" the Weibull shape parameter, λ, and the mean are approximately 63% of the resulting Recommended HHF and the scale parameter, k, is approximately 3.8. A symmetric distribution would

have a scale parameter equal to 3.6, meaning that these scores are slightly skewed to the right. Plotting the CDF of the USPSA membership's current classification percentages in Figure 3 also yields a Weibull distribution.

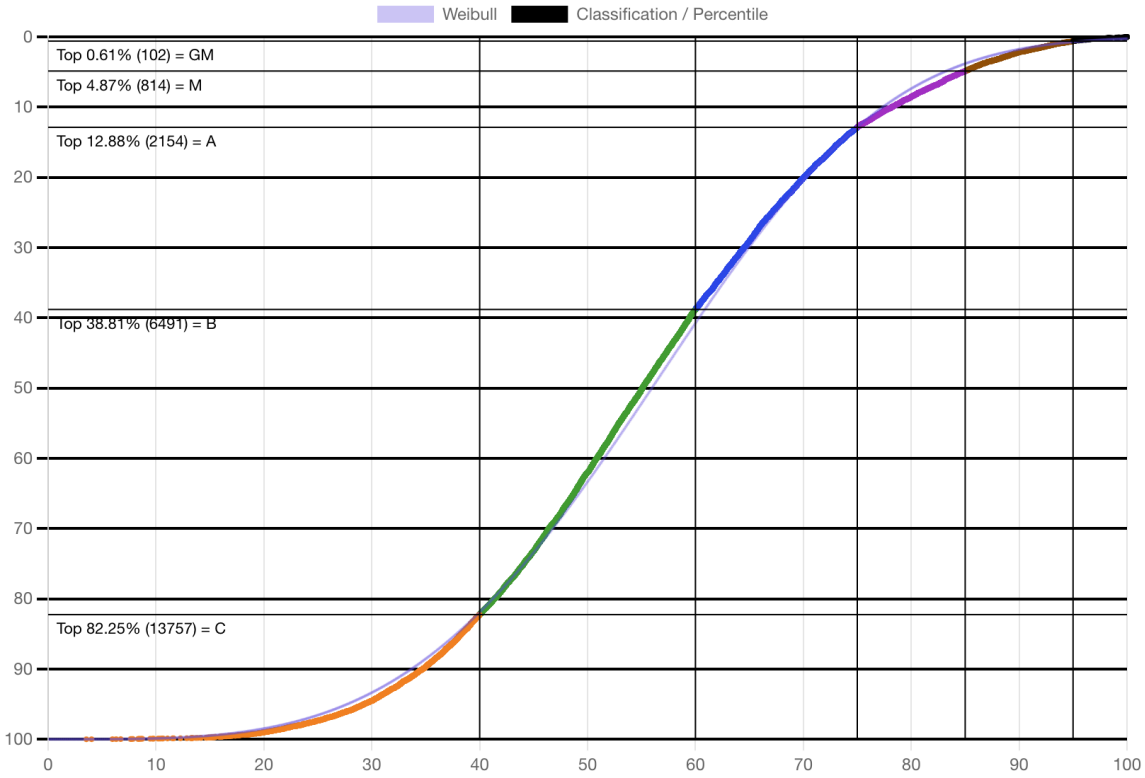


Figure 3: Current USPSA Members' Classification Percentage in Carry Optics

With the ideal percentile targets in mind, the HHF can be picked by selecting the Hit Factor that meets the percentile target and then dividing it by the target's percentage. For example, if the Grandmaster target is used, then the Hit Factor for the 99th Percentile is found and divided by 0.95. Using the real data, a linear regression between two real scores closest to the target is conducted to find the target Hit Factor, which was further improved by fitting a theoretical Weibull distribution to the existing data. The resulting HHFs proved very obtainable but resulted in noticeably inflated classification percentages. Which means that the ideal targets identified above are too easy for the existing classification score averaging algorithm that encourages "Hero-or-Zero" behavior. However, these targets make sense for the sport as a whole, and we recommend moving away from "Hero-or-Zero" classification to consistent "match day performance" classification. Specifics will be discussed in Section 5.

3 High Hit Factors

We established the following algorithm to calculate the new Recommended High Hit Factors:

1. Using Negative Log Likelihood (NLL) error function and Nelder-Mead optimization algorithm, the Weibull Distribution is fit to the data points.
2. Using the CDF of fitted Weibull Distribution, the 90% of HHF is found, with the 97th Percentile as a target.
3. The final HHF is obtained by dividing that HF by 0.9.

First, we have decided to use the fitted Weibull Distribution instead of linear interpolation due to its smoothness and better ability to predict final HHFs when the data is scarce or incomplete. For example, when there is significantly less data, a fitted Weibull Distribution can converge on an HHF with very few scores.

With as little as 120 scores in 24-08 "And now for something completely different", the HHF can be found within 5% (±0.25 HF) of the final HHF calculated with 1,173 scores.

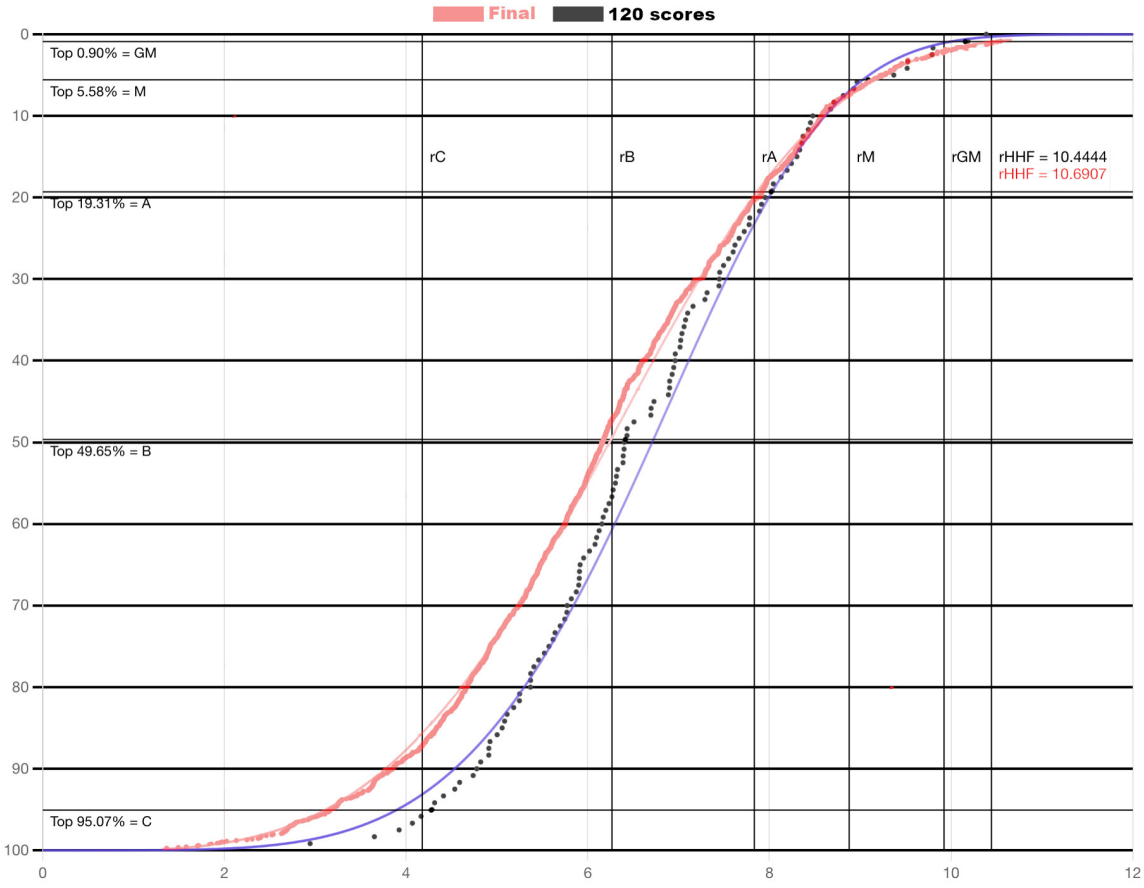


Figure 4: Weibull Accuracy Analysis with Scarce Data

The unique benefit of Percentile Targeting using the Weibull distribution is that one only needs a small number of scores distributed around the average of the distribution to find a reasonable HHF. As demonstrated in Figure 4, it stabilizes quickly and remains stable as scores are added. Unlike other previous methods of calculating HHF, using Percentile Targeting tracks with the skill distribution of the membership. This effectively eliminates the problem of classifiers becoming "Shot Out" as more record scores are posted.

The 97th Percentile equals 90% of HHF target was obtained through optimization and simplification of four targets, which were observed by normalizing all classifier scores in Carry Optics division and mapping them out on

a single graph, aligned by current USPSA HHFs. We initially tried using a mixed Weibull plus "multi-target log10" HHF method, which tries to set HHF by minimizing the log10 distance from the targets selected from the fitted Weibull distribution. However, we quickly found that using a single 3/90 target produces the same result (less than 1% difference).

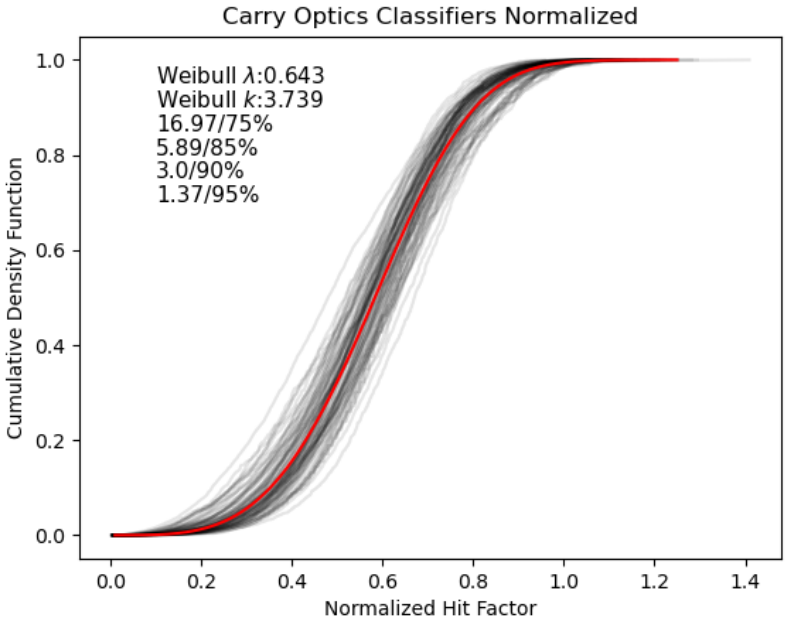


Figure 5: The CDF of all Carry Optics Classifiers Normalized; 1 = current HHF

Using this strategy, we arrived at a standardized method for calculating classifier percentages that accurately reflects members' skill levels and calibrates the difficulty of every individual classifier to the same level. Thanks to the statistical methods, this approach effectively eliminated subjectivity and bias from the process and made it 100% data-driven.

3.1 Division-Specific Considerations

Recent rule changes in Production and Limited-10 divisions, along with the relatively new Limited Optics division, necessitated special considerations in our HHF calculations. We applied the following division-specific approaches:

3.1.1 Production Division

The Production division recently increased its magazine capacity from 10 to 15 rounds. This change significantly impacts classifiers that require more than 10 rounds between reloads. For these classifiers, we implemented a specialized calculation approach:

We identified the following affected classifiers:

- 99-10 Times Two
- 03-03 Take em Down
- 09-10 Life's Little Problems
- 19-01 HI-Jinx
- 19-02 HI-Way Robbery

- 19-04 HI Cost of Living
- 20-01 Wish You Were Here
- 20-02 Deja Vu
- 20-03 Deja Vu All Over Again
- 21-01 8 x 3 Trigger Freeze
- 22-01 Righty Tighty
- 22-02 Lefty Loosey
- 23-01 THS Short Course
- 23-02 This could be the Greatest Night of Our Lives
- 24-02 This is more better now
- 24-06 Surely you can't be serious
- 24-08 And now for something completely different
- 24-09 Tres Cajas

For each of these classifiers, we calculated Recommended HHFs using three distinct data sets:

- All Production Division Scores
- "Production 10" period scores (before Jan 31st, 2024)
- "Production 15" period scores (after Jan 31st, 2024)

We then selected the highest of these three calculations as the final Recommended HHF. This approach ensures fair calibration while accommodating the significant rule change.

3.1.2 Limited Optics Division

The Limited Optics division is relatively new to USPSA and shares many characteristics with Carry Optics. To ensure robust HHF calculations despite the smaller data set in Limited Optics, we compared calculations from both divisions. For each classifier, we selected the higher Recommended HHF between Carry Optics and Limited Optics division scores. This method provides appropriate difficulty levels while the Limited Optics division continues to grow.

3.1.3 Limited-10 Division

For the Limited-10 division, we have not calculated new HHFs at this time. This division remains in a temporary holding period while we collect sufficient data for accurate HHF calibration. Once we gather enough scores under the current division rules, we will apply the same methodology to establish appropriate HHFs for Limited-10.

3.2 Final HHFs & Continuous Review

Using these methods and considerations, we have prepared the initial list of Recommended High Hit Factors for all divisions (except Limited-10), which is included in Appendix B.

Moving forward, we will recalculate HHFs semi-annually and provide the updates for the USPSA IT department to implement manually until we develop an automated process to recalculate HHFs from the data during the weekly classification update. The existing method is fully programmatic, but it's implemented independently from the USPSA.org website and must be converted and integrated into existing USPSA services.

4 Classifier Quality Rating

Not all classifiers are created equal, and their score distributions vary in the level of normality and correlation to Major Match performance and classification percentage. In order to analyze these factors, we have introduced a quality metric that is using the following components:

1. Correlation to Elo rating (rElo)
2. Correlation to Classification percentage (rClassification)
3. Super Mean Squared Error function (SMSE)

The correlation components are similar to those covered in the Process Overview section, but the SMSE is new. Effectively, SMSE is just a Mean Squared Error function applied against a reshaped Weibull distribution (by setting k=3.6). By using a completely symmetrical shape to compare against, we can better quantify the asymmetry and lack of smoothness and normality in real-life data.

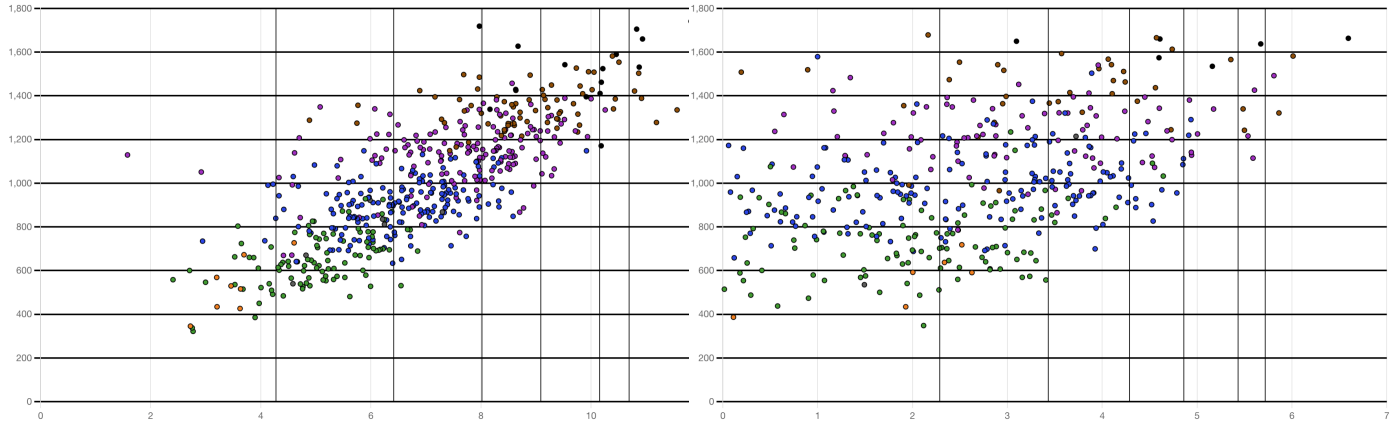
With this in mind, the final formula for the new quality rating is as follows:

$$Q = \frac{200 \times rElo \ + \ 100 \times rCorrelation}{2.4} \ - \ SMSE$$

The weights of each component in this formula were calibrated to prioritize correlation to Major Match performance first, shooter's classification second, and overall smoothness/normality of the graph third. The multipliers were picked to produce a percent-like final score ranging from 0(worst classifiers) to 97.81 (best classifier).

4.1 Quality Analysis

To better illustrate this, let's take a look at the Elo Rating and Super Mean Squared Error function components of two separate classifiers. The best Elo correlating classifier we have is 24-08 "And now for something completely different". 24-08 is a large field course stage unlike traditional classifier stages and is very similar to stages seen at local and Major Matches around the country. As such, one would expect it to correlate very well with Elo. Looking at Figure 6a, with Hit Factor on the x-axis and Elo on the y-axis, scores distribute fairly well linearly, indicating a high mathematical correlation.



(a) 24-08 And now for something completely different

(b) 99-47 Triple Choice

Figure 6: Hit Factor vs. Elo Correlation

Conversely, 99-47 “Triple Choice” is a three string, Virginia Count, classifier with strong hand only and weak hand only on hard partial targets. Looking at Figure 6b, you can see that the scores are spread out in a cloud in a very disordered manner. Mathematically, this stage does not correlate well with Major Match Elo ratings.

Now, to better illustrate the SMSE and MSE metrics of classifiers, let’s take a look at the scores distribution of 24-08 “And now for something completely different” (one of the best) and 08-01 “4 Bill Drill” (one of the worst).

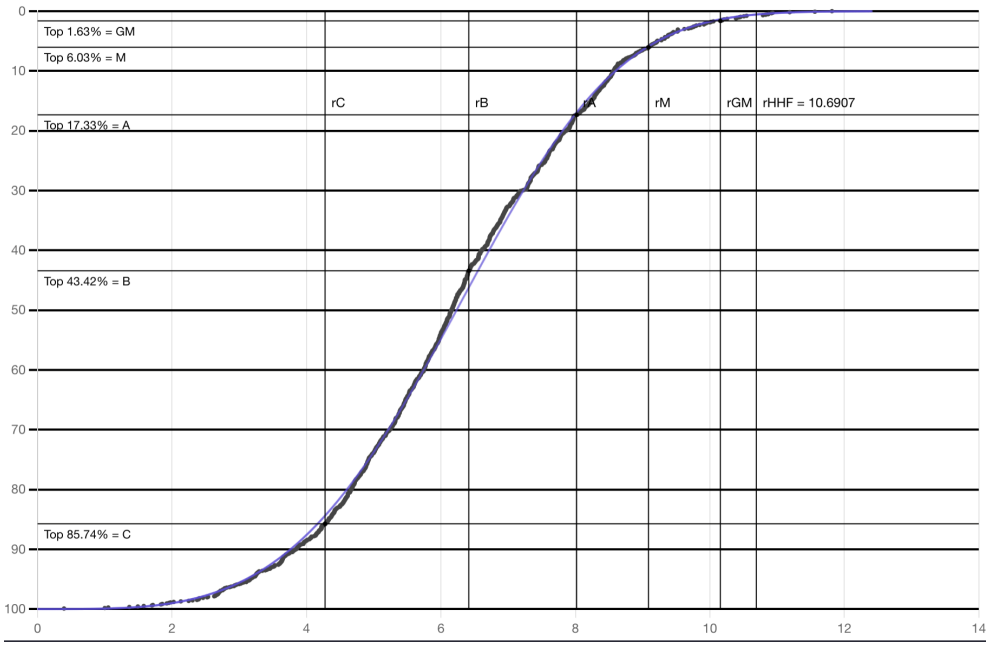


Figure 7: 24-08 Scores Distribution

As you can see, the scores distribution for 24-08 is very smooth, with strong left and right tails, and follows the Weibull almost perfectly. This results in low SMSE and MSE values and shows that 24-08 measures the performance of all levels of shooters equally, almost without any unnecessary risk factors and tanked scores.

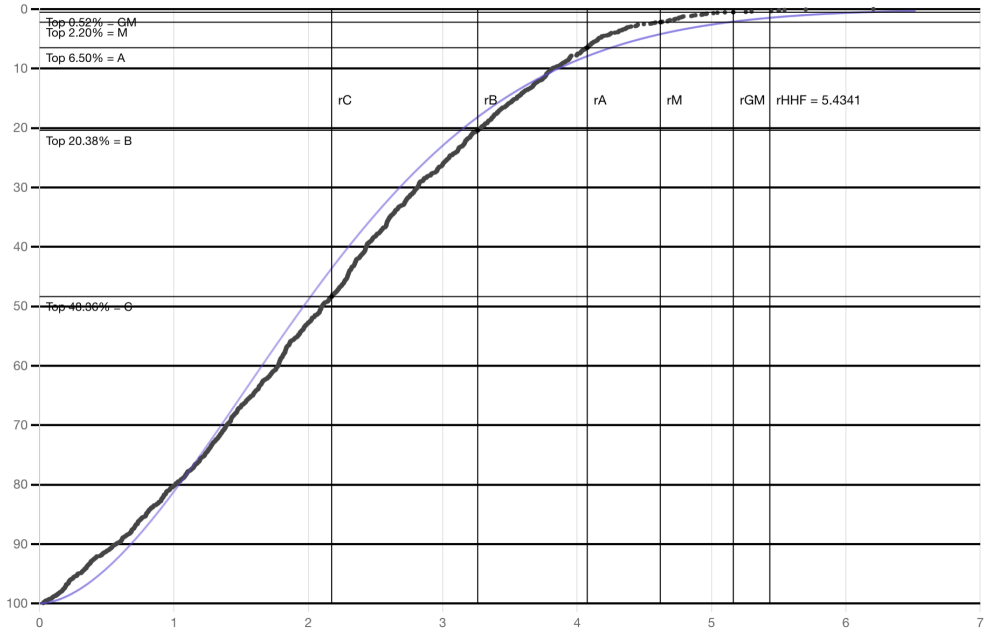


Figure 8: 08-01 Scores Distribution

Now, compare it to Figure 8, with obvious deviations of real-life data from Weibull and almost no left-tail, which means extra unnecessary risks and a high chance of tanking the score below one's actual skill level.

4.2 Overall Classifier Quality

To accommodate all USPSA divisions, we calculated quality ratings for all division-classifier pairs and then selected the most popular yet distinct divisions to calculate the Overall Classifier Quality score. For this final rating, we used the following divisions:

- Open (highest HHFs handgun division)
- Limited (most popular iron sights division)
- Carry-Optics (most popular division)
- PCC (the only non-handgun division)

We weighted each division equally in our final formula, giving each quality score the same importance. The resulting ratings were very similar across all categories of classifiers except Fixed Time, where the Recommended High Hit Factor algorithm produced unattainable HHFs for the PCC division.

The fundamental issue with Fixed Time classifiers is that they use identical time limits across all divisions. This makes them significantly easier for PCC competitors and allows shooters of lower skill levels to obtain higher-level classifications. When our Recommended High Hit Factor algorithm, which uses automated statistical methods, was applied to these stages, it generated HHFs for PCC that exceeded the available points on several Fixed Time stages. This created the mathematical impossibility of requiring Grandmaster scores higher than the total available points.

Implementing changes to Fixed Time classifiers would require either increasing the available stage points or reducing the par time for affected stages, followed by collecting entirely new data. Since either approach would require significant modifications to the Fixed Time stages, we recommend retiring all current Fixed Time classifiers. We will evaluate the potential addition of new Fixed Time stages or modifications to existing stages at a later date.

4.3 Final Reduction Classifier List, New Stages, and Continuous Review

The shortened classifier list is subject to periodic review based on popularity, quality, and other changes to the data and the USPSA Classification System. We look forward to introducing new classifier stages in the coming months. New classifier stages will be introduced in a provisional manner available to all affiliated clubs. Clubs and Major Matches are encouraged to set them up and use them like a normal classifier. Data recorded during the provisional period will be analyzed and used to determine whether to accept the stage as an official classifier and to set the High Hit Factor. Specifics on how match directors should set provisional stages up in PractiScore and how scores will be applied to members' classification record will be detailed in a later report and FAQ.

See Appendix A for the list of retired classifiers and their performance metrics and Appendix B for the current recommended active list of classifiers and their HHFs.

5 Classification Algorithm

Establishing good classifiers and High Hit Factors is an important step in improving the USPSA Classification System, but it's only part of the solution. After obtaining valid scores and converting them to percentages, we must calculate a competitor's classification by combining multiple scores into a single number. As mentioned earlier, the recommended High Hit Factors alone without changes to the Classification Algorithm will result in inflated classification percentages. The current algorithm encourages "Hero-or-Zero" performance and has resulted in most members shooting classifier stages radically different than regular stages. The recommendations below are intended to measure the average performance rather than the peak performance of a competitor.

5.1 B, C, D, and G Flags and Class Protection

The current USPSA Classification System employs a flagging system to identify certain scores for special handling during classification calculations. These flags have shaped competitor behaviors and strategies, often in ways that don't align with the goal of accurately measuring shooting performance. Understanding these flags is essential to appreciating our recommended changes.

5.1.1 Current Flag Definitions

- B-flag: Identifies scores more than 5% below the member's current class
- C-flag: Identifies scores more than one full class below the member's current class in another division
- D-flag: Identifies duplicate classifier scores, marking the lower score(s) among duplicates within the most recent eight
- G-flag: Identifies scores lower than 2% of the HHF

5.1.2 Problems with the Current System

These flags, particularly B, C, and G, create "class protection" or "tanking protection" against low classifier scores. This protection prevents competitors' classification percentages from dropping when they perform significantly below their established class level. The resulting dynamic has encouraged a "Hero-or-Zero" approach to classifiers, where competitors:

1. Attempt high-risk, all-or-nothing runs far beyond their normal performance level
2. Benefit from exceptional "Hero" scores that count toward their classification
3. Face no consequences for "Zero" scores that get filtered out by the flag system

This approach distorts classification percentages, as competitors' scores reflect lucky peak performances rather than consistent skill levels. By contrast, stages zeroed in regular matches always count against a competitor, encouraging controlled performance at a sustainable skill level.

5.1.3 Balancing Algorithm Changes with HHF Adjustments

To compensate for the increased difficulty of the classification algorithm with the B, C, D, and G flags removed, the Recommended High Hit Factors are lower than before the recommended changes. The Recommended HHFs have been carefully refined in coordination with the flag system changes to keep the overall difficulty of the Classification System approximately the same.

5.1.4 Recommended Flag System Changes

To create a more accurate classification system, we recommend complete removal of B, C, and G Flags:

- All recent, non-duplicate scores will count toward classification, including zeros
- Only DNFs and scores with no shots recorded will be excluded
- This change removes artificial class protection and encourages realistic classifier performances

We also recommend a modification to D Flag Logic:

- Same-Day Average (SDA): Multiple attempts at the same classifier on the same day will be averaged into a single score
- Most Recent Override (MRO): For classifiers shot on different days, only the most recent attempt will count, replacing the current system that used the best score

5.1.5 Discouraging Flag Protection

These changes discourage the "Hero-or-Zero" gaming strategy and result in classification percentages that more accurately reflect competitors' consistent performance levels. The removal of class protection will be balanced by our recalibrated HHFs, maintaining appropriate overall difficulty while improving the system's accuracy.

5.2 Active Classification Window

The initial classification algorithm that we optimized for the highest level of correlation with Elo ratings used the best six out of the most recent twelve window, which increased the inertia factor for the classification percentage. It was necessary because in our first iteration, we only considered the current percentage, allowing the shooter's classification to go up and down.

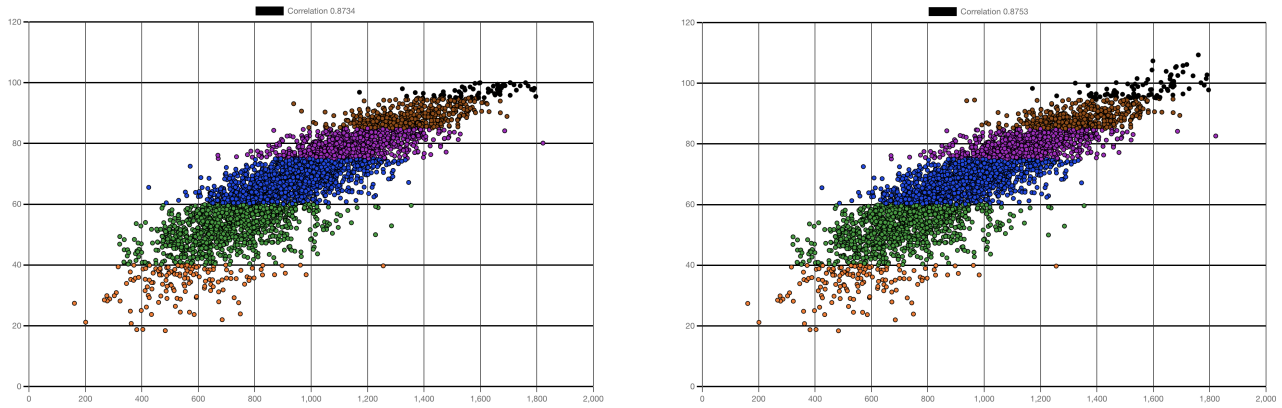
Very early in the formation of the USPSA Classifier Committee, we agreed that we were not willing to allow classification letter deranking. The USPSA Classification currently serves as both a recognition of achievement and a record of one's peak ability, and we would like to keep it this way.

We realize this might not be the most optimal way to ensure a high correlation between classification and Elo ratings, so we analyzed difficulty parameters with a balance between existing algorithms and new correlations. Luckily for us, after switching to the new system to High Percentage, we quickly realized that modification of the Active Classification Window isn't necessary, and the new algorithm still correlates much better than the old one, using the same "minimum 4, best 6 out of most recent 8 scores" window.

So, to prevent unnecessary changes and keep things that shooters know by heart as-is, we have decided to keep the window the same.

5.3 Classifier Score Ceiling

The final recommended change to the Classification System is to expand the classifier score range by increasing the ceiling from 100% to 110% of the Recommended High Hit Factor. Because lower HHFs inherently compress the top scores, differentiation becomes more difficult. Raising the ceiling provides more room for distinction, acting as a buffer against the loss of "class protection" while maintaining a fair distribution that rewards consistent skill and performance.



(a) 100% Score Ceiling

(b) 110% Score Ceiling

Figure 9: Major Match Elo vs. Classification Percentage

For example, a Master-class competitor aiming for Grandmaster now has a wider range of scores (95–110%) to work with to raise their average above 95%, while still being penalized for scores below 80%. Figure 9 compares the two score ceilings using a correlation graph of Elo (x-axis) to Classification Percentage (y-axis). Figure 9(b) shows that with the 110% score ceiling, the Grandmaster range maintains a linear correlation with Elo.

6 Conclusion

This report fulfills the USPSA Classifier Committee's charter by documenting our methodology and recommendations for comprehensive Classification System improvements. Our work has focused on five key areas:

1. Standardized High Hit Factors: We have developed a data-driven method using Weibull distribution analysis with Percentile Targeting to calculate consistent, objective HHFs across all divisions. This approach eliminates subjectivity and "shot out" classifiers while ensuring equitable difficulty levels.
2. Reinstatement of the 23- and 24-Series Classifiers: A primary task of our committee was to address the miscalibrated HHFs in the 23- and 24-series classifiers. Our new methodology has successfully recalibrated these stages, making them viable and fair classifiers that can now be reinstated into the active classifier list.
3. Classification Algorithm Updates: By removing the B, C, and G flags while modifying the D flag logic, we have created a system that better represents shooters' consistent performance rather than isolated peak moments. The increased score ceiling to 110% provides additional room for exceptional performances while still maintaining the integrity of the classification brackets.
4. Classifier List Optimization: Through quality evaluation metrics, we have identified and recommended retiring underperforming classifiers while maintaining a balanced set of stages that correlate well with Major Match performance.
5. Division-Specific Calibrations: We have addressed unique considerations for Production, Limited Optics, and Limited-10 divisions, ensuring that recent rule changes are appropriately accommodated in the classification system.

These updates represent only the beginning of our ongoing work. Future initiatives include programming the methodology into the USPSA system for automated updates, developing the 25-series classifier stages, and continuous refinement of the classification process. We will provide semi-annual HHF updates to ensure the system remains current with the evolving skill distribution of our membership.

We welcome your feedback and questions about these recommendations.

The Classifier Committee can be reached at classification@uspsa.org.

References

- Weibull Distribution: https://en.wikipedia.org/wiki/Weibull_distribution
- Negative Log Likelihood Loss: https://sebastianraschka.com/faq/docs/negative-log-likelihood-logistic-loss.html
- Nelder-Mead https://en.wikipedia.org/wiki/Nelder–Mead_method
- Correlation Matrix https://en.wikipedia.org/wiki/Correlation
- Hit Factor Info (HFI): https://www.hitfactor.info
- Elo ratings: https://www.patreon.com/ShootingSportsAnalyst

Appendix A: Recommended Retired Classifiers

Table 1: Retired Classifiers

	Quality Score			
Classifier	**Open**	**Limited**	**CO**	**PCC**
99-02 Night Moves	66.52	32.20	65.14	68.97
99-07 Both Sides Now #1	50.64	-16.68	32.57	71.27
99-14 Hoser Heaven	-4.21	-151.23	-37.77	-9.12
99-16 Both Sides Now #2	72.85	33.43	76.43	64.15
99-21 Mini Mart	67.23	64.13	73.95	68.55
99-22 Nueve El Presidente	43.60	15.15	53.74	71.72
99-23 Front Sight	62.72	81.80	72.71	63.52
99-24 Front Sight 2	36.49	24.50	49.61	55.95
99-33 Raw Deal	62.30	39.18	68.99	62.88
99-40 Partial People Eaters	72.25	69.98	78.77	-41.88
99-41 Works For Me	75.83	70.82	79.20	72.09
99-47 Triple Choice	9.50	-71.61	-41.93	77.20
99-48 Tight Squeeze	40.16	-42.93	39.17	71.34
99-51 Single Tap Standards	79.50	53.88	81.90	83.98
99-56 On the Upper Pad II	74.44	87.28	79.57	50.68
99-59 Lazy Man Standards	-0.27	-110.37	-71.73	72.34
99-61 Sit Or Get Off The Shot	0.07	-106.64	-57.73	71.16
99-63 Merles Standards	-19.02	-114.54	-34.49	51.45
03-02 Six Chickens	41.03	-54.43	21.35	72.89
03-04 3-V	50.10	10.60	35.75	44.10
03-11 El Strong & Weak Pres	30.55	-72.16	0.83	68.86
03-12 Ironsides	76.27	33.33	75.68	76.49
03-14 Baseball Standards	70.30	31.82	43.06	23.00
06-01 Big Barricade	66.60	12.37	67.33	74.06
06-02 Big Barricade II	77.86	20.30	60.94	77.48
06-06 Golden Bullet Standards	79.74	56.87	77.56	81.36
08-01 4 Bill Drill	-10.32	-125.68	-56.62	47.14
09-01 Six In Six Challenge	78.48	68.94	76.17	20.22
09-02 Diamond Cutter	24.46	-2.14	28.65	35.82
09-03 Oh No	19.69	-61.02	-5.13	50.18
09-04 Pucker Factor	46.25	-5.84	40.25	54.87
09-07 It's Not Brain Surgery	-37.72	-80.50	-33.24	33.55
09-08 Crackerjack	71.99	-12.47	58.97	73.16
09-09 Lightning And Thunder	41.70	78.16	78.09	-22.85
09-13 Table Stakes	35.48	-7.95	31.10	66.06
09-14 Eye Of The Tiger	7.30	-33.99	2.34	33.04
13-01 Disaster Factor	49.70	-3.76	48.68	65.46
13-03 Short Sprint Standards	31.13	-59.50	6.21	77.31
13-07 Double Deal 2	57.12	24.83	41.65	67.03
13-08 More Disaster Factor	39.61	-10.89	47.33	61.08
18-01 Of Course It Did	47.33	-51.38	8.94	77.14

Table 1: Retired Classifiers (Continued)				
	Quality Score			
Classifier	**Open**	**Limited**	**CO**	**PCC**
18-02 What Is With You People	31.67	-35.86	9.05	70.15
18-04 Didn't You Send The Mailman	66.81	36.24	51.10	64.24
18-06 For That Day	-35.01	-115.28	-82.22	41.17
19-03 HI'er Love	72.39	15.40	49.89	58.13
22-05 Win Some Lose Some	49.77	72.47	59.01	57.26

Appendix B: High Hit Factor Tables

Table 2: Open Division

Classifier	Rec. HHF	Old HHF	Change
99-08 Melody Line	10.2480	11.8006	-1.5526
99-10 Times Two	10.7383	11.8913	-1.1530
99-11 El Presidente	12.1268	13.5751	-1.4483
99-12 Take Your Choice	10.3270	11.7511	-1.4241
99-13 Quicky II	9.1619	10.8147	-1.6528
99-19 Paynes Pain	6.8220	7.6889	-0.8669
99-28 Hillbillton Drill	11.0113	12.3076	-1.2963
99-42 Fast n Furious	10.6028	12.1285	-1.5257
99-46 Close Quarter Standards	9.5514	11.2567	-1.7053
99-53 Triple Play	7.8809	8.6140	-0.7331
99-57 Bookouts Boogie	8.2959	8.8680	-0.5721
99-62 Bang and Clang	12.6035	14.5696	-1.9661
03-03 Take em Down	9.1147	9.4099	-0.2952
03-05 Paper Poppers	10.5139	11.7506	-1.2367
03-07 Riverdale Standards	7.3237	8.4324	-1.1087
03-08 Madness	10.4963	11.9260	-1.4297
03-09 On the Move	11.7681	12.6808	-0.9127
03-18 High Standards	8.6641	9.4752	-0.8111
06-03 Can You Count	15.9747	17.2943	-1.3196
06-04 Fluffy's Revenge 1	15.0386	16.1215	-1.0829
06-05 Fluffy's Revenge 2	13.8309	15.1956	-1.3647
06-10 Steely Speed VII	9.9858	10.9065	-0.9207
08-02 Steeler Standards	7.7780	7.9667	-0.1887
08-03 Six	11.4774	12.0992	-0.6218
09-10 Life's Little Problems	13.2004	12.8263	0.3741
13-02 Down The Middle	13.7867	15.2209	-1.4342
13-04 The Roscoe Rattle	13.7116	13.8923	-0.1807
13-05 Tick Tock	11.9573	12.3668	-0.4095
13-06 Too Close For Comfort	9.7524	10.4555	-0.7031
18-03 We Play Games	8.1979	8.4484	-0.2505
18-05 No Need To Believe In Either Side	10.5996	10.9085	-0.3089
18-07 Someone Is Always Willing To Pay	9.5927	9.7812	-0.1885
18-08 The Condor	6.6239	6.5709	0.0530
18-09 I Miss That Kind of Clarity	10.8722	11.1142	-0.2420
19-01 HI-Jinx	11.0015	11.5432	-0.5417
19-02 HI-Way Robbery	10.5263	10.6113	-0.0850
19-04 HI Cost of Living	11.2291	11.5179	-0.2888
20-01 Wish You Were Here	9.1465	9.4933	-0.3468
20-02 Deja Vu	12.9051	12.7319	0.1732
20-03 Deja Vu All Over Again	11.1878	11.6035	-0.4157
21-01 8 x 3 Trigger Freeze	17.4430	18.0000	-0.5570
22-01 Righty Tighty	9.3689	9.3400	0.0289

Table 2: Open Division (Continued)			
Classifier	**Rec. HHF**	**Old HHF**	**Change**
22-02 Lefty Loosey	8.4795	8.6822	-0.2027
22-04 Calm Before the Storm	12.0442	11.3231	0.7211
22-06 Blues Don't Care	13.4761	13.5458	-0.0697
22-07 Cross Road Blues	10.1495	10.3344	-0.1849
23-01 THS Short Course	11.2515	10.1621	1.0894
23-02 This could be the Greatest Night of Our Lives	11.6034	10.9589	0.6445
24-01 Can you Strong and Weak Hand?	11.6816	12.5416	-0.8600
24-02 This is more better now	10.5066	13.7435	-3.2369
24-04 The Thrill of the Bill Drill	10.2616	12.8598	-2.5982
24-06 Surely you can't be serious	12.5441	14.7299	-2.1858
24-08 And now for something completely different	13.5619	14.2959	-0.7340
24-09 Tres Cajas	11.4304	12.7441	-1.3137

Table 3: Limited Division

Classifier	**Rec. HHF**	**Old HHF**	**Change**
99-08 Melody Line	8.9179	10.6766	-1.7587
99-10 Times Two	9.4640	10.9574	-1.4934
99-11 El Presidente	10.5552	12.4345	-1.8793
99-12 Take Your Choice	8.6208	11.2421	-2.6213
99-13 Quicky II	8.1491	10.7708	-2.6217
99-19 Paynes Pain	6.0720	7.2793	-1.2073
99-28 Hillbillton Drill	9.6007	11.2482	-1.6475
99-42 Fast n Furious	8.8533	10.3788	-1.5255
99-46 Close Quarter Standards	8.7102	10.6073	-1.8971
99-53 Triple Play	6.5956	7.2682	-0.6726
99-57 Bookouts Boogie	6.5598	7.9192	-1.3594
99-62 Bang and Clang	11.0471	13.3115	-2.2644
03-03 Take em Down	7.7467	8.8509	-1.1042
03-05 Paper Poppers	9.2086	10.4977	-1.2891
03-07 Riverdale Standards	6.6684	8.0271	-1.3587
03-08 Madness	9.1769	10.5500	-1.3731
03-09 On the Move	9.8835	11.3955	-1.5120
03-18 High Standards	7.2815	8.8814	-1.5999
06-03 Can You Count	14.7247	16.6378	-1.9131
06-04 Fluffy's Revenge 1	13.4818	15.2610	-1.7792
06-05 Fluffy's Revenge 2	11.9768	13.4494	-1.4726
06-10 Steely Speed VII	8.2886	10.8013	-2.5127
08-02 Steeler Standards	6.4844	7.2443	-0.7599
08-03 Six	10.0709	11.1488	-1.0779
09-10 Life's Little Problems	11.6928	11.7045	-0.0117
13-02 Down The Middle	11.2734	13.3483	-2.0749
13-04 The Roscoe Rattle	12.1329	12.8041	-0.6712
13-05 Tick Tock	10.5496	11.3861	-0.8365

Table 3: Limited Division (Continued)			
Classifier	**Rec. HHF**	**Old HHF**	**Change**
13-06 Too Close For Comfort	8.6031	10.0814	-1.4783
18-03 We Play Games	7.5523	8.0502	-0.4979
18-05 No Need To Believe In Either Side	8.6724	9.4483	-0.7759
18-07 Someone Is Always Willing To Pay	8.4875	9.3096	-0.8221
18-08 The Condor	5.9765	6.1646	-0.1881
18-09 I Miss That Kind of Clarity	9.9868	10.5711	-0.5843
19-01 HI-Jinx	9.3088	9.9947	-0.6859
19-02 HI-Way Robbery	9.2994	9.6827	-0.3833
19-04 HI Cost of Living	9.7688	10.2050	-0.4362
20-01 Wish You Were Here	8.1732	8.5677	-0.3945
20-02 Deja Vu	11.4445	11.9111	-0.4666
20-03 Deja Vu All Over Again	9.8941	10.4734	-0.5793
21-01 8 x 3 Trigger Freeze	14.2892	15.2999	-1.0107
22-01 Righty Tighty	8.1166	8.4942	-0.3776
22-02 Lefty Loosey	7.2761	8.0000	-0.7239
22-04 Calm Before the Storm	10.2002	10.5000	-0.2998
22-06 Blues Don't Care	12.2087	12.0534	0.1553
22-07 Cross Road Blues	9.0338	9.3456	-0.3118
23-01 THS Short Course	9.7060	9.9141	-0.2081
23-02 This could be the Greatest Night of Our Lives	10.3271	10.4348	-0.1077
24-01 Can you Strong and Weak Hand?	10.8953	12.5018	-1.6065
24-02 This is more better now	8.7133	9.7360	-1.0227
24-04 The Thrill of the Bill Drill	9.1569	11.3568	-2.1999
24-06 Surely you can't be serious	9.5424	11.9884	-2.4460
24-08 And now for something completely different	9.4982	11.3115	-1.8133
24-09 Tres Cajas	9.9065	11.7694	-1.8629

Table 4: Production Division

Classifier	**Rec. HHF**	**Old HHF**	**Change**
99-08 Melody Line	8.6815	9.3922	-0.7107
99-10 Times Two	9.6784	9.7000	-0.0216
99-11 El Presidente	10.1008	11.6423	-1.5415
99-12 Take Your Choice	8.2024	9.4725	-1.2701
99-13 Quicky II	7.8517	8.9461	-1.0944
99-19 Paynes Pain	5.7621	6.5106	-0.7485
99-28 Hillbillton Drill	9.5264	10.4252	-0.8988
99-42 Fast n Furious	8.7342	10.0336	-1.2994
99-46 Close Quarter Standards	8.3440	9.4941	-1.1501
99-53 Triple Play	6.6737	7.0137	-0.3400
99-57 Bookouts Boogie	6.5202	7.2000	-0.6798
99-62 Bang and Clang	10.9717	12.5622	-1.5905
03-03 Take em Down	7.7559	8.3000	-0.5441
03-05 Paper Poppers	9.3031	10.3000	-0.9969

Table 4: Production Division (Continued)			
Classifier	**Rec. HHF**	**Old HHF**	**Change**
03-07 Riverdale Standards	6.5169	7.1572	-0.6403
03-08 Madness	8.9653	9.6470	-0.6817
03-09 On the Move	9.4383	10.9060	-1.4677
03-18 High Standards	6.9113	7.9574	-1.0461
06-03 Can You Count	14.6823	15.9889	-1.3066
06-04 Fluffy's Revenge 1	13.2922	14.5282	-1.2360
06-05 Fluffy's Revenge 2	11.8463	13.3166	-1.4703
06-10 Steely Speed VII	8.4840	9.9200	-1.4360
08-02 Steeler Standards	6.5373	6.9370	-0.3997
08-03 Six	10.0864	11.2794	-1.1930
09-10 Life's Little Problems	11.6880	11.2000	0.4880
13-02 Down The Middle	11.5497	12.9901	-1.4404
13-04 The Roscoe Rattle	11.7612	12.3197	-0.5585
13-05 Tick Tock	10.0557	10.5911	-0.5354
13-06 Too Close For Comfort	8.2698	9.2398	-0.9700
18-03 We Play Games	7.2358	7.4753	-0.2395
18-05 No Need To Believe In Either Side	8.6994	9.2136	-0.5142
18-07 Someone Is Always Willing To Pay	8.4060	8.8850	-0.4790
18-08 The Condor	5.8198	5.7822	0.0376
18-09 I Miss That Kind of Clarity	9.7043	9.7503	-0.0460
19-01 HI-Jinx	8.7615	10.0000	-1.2385
19-02 HI-Way Robbery	8.8605	10.0000	-1.1395
19-04 HI Cost of Living	9.3669	10.0000	-0.6331
20-01 Wish You Were Here	7.9009	8.2000	-0.2991
20-02 Deja Vu	10.8952	11.5000	-0.6048
20-03 Deja Vu All Over Again	9.2110	10.5000	-1.2890
21-01 8 x 3 Trigger Freeze	13.2046	14.5000	-1.2954
22-01 Righty Tighty	7.8822	8.0000	-0.1178
22-02 Lefty Loosey	7.2952	7.5000	-0.2048
22-04 Calm Before the Storm	9.6929	9.7500	-0.0571
22-06 Blues Don't Care	11.7798	12.0534	-0.2736
22-07 Cross Road Blues	8.5390	9.0000	-0.4610
23-01 THS Short Course	9.4988	9.2307	0.2681
23-02 This could be the Greatest Night of Our Lives	10.3769	9.8554	0.5215
24-01 Can you Strong and Weak Hand?	10.6310	11.4687	-0.8377
24-02 This is more better now	8.3501	9.5830	-1.2329
24-04 The Thrill of the Bill Drill	9.5393	10.6235	-1.0842
24-06 Surely you can't be serious	8.5693	9.3090	-0.7397
24-08 And now for something completely different	9.3193	9.8406	-0.5213
24-09 Tres Cajas	9.3329	10.0625	-0.7296

Table 5: Revolver Division

Classifier	Rec. HHF	Old HHF	Change
99-08 Melody Line	6.9174	7.4457	-0.5283
99-10 Times Two	7.2673	8.2322	-0.9649
99-11 El Presidente	7.7012	9.1836	-1.4824
99-12 Take Your Choice	6.3698	7.6527	-1.2829
99-13 Quicky II	7.0364	6.8321	0.2043
99-19 Paynes Pain	4.2812	5.5527	-1.2715
99-28 Hillbillton Drill	7.2810	7.4486	-0.1676
99-42 Fast n Furious	6.6855	6.9426	-0.2571
99-46 Close Quarter Standards	7.0940	7.7929	-0.6989
99-53 Triple Play	4.4796	5.0346	-0.5550
99-57 Bookouts Boogie	5.1125	5.1138	-0.0013
99-62 Bang and Clang	9.7967	10.6733	-0.8766
03-03 Take em Down	6.0017	5.3679	0.6338
03-05 Paper Poppers	7.3457	7.9055	-0.5598
03-07 Riverdale Standards	5.3806	5.4718	-0.0912
03-08 Madness	7.5661	6.6786	0.8875
03-09 On the Move	8.4954	7.9866	0.5088
03-18 High Standards	5.8793	6.4829	-0.6036
06-03 Can You Count	10.6750	11.4323	-0.7573
06-04 Fluffy's Revenge 1	11.3275	9.8645	1.4630
06-05 Fluffy's Revenge 2	9.9516	9.4829	0.4687
06-10 Steely Speed VII	8.0047	8.1072	-0.1025
08-02 Steeler Standards	5.1830	5.0686	0.1144
08-03 Six	8.9229	8.7825	0.1404
09-10 Life's Little Problems	7.5746	6.9659	0.6087
13-02 Down The Middle	11.0759	10.7716	0.3043
13-04 The Roscoe Rattle	9.6401	9.4282	0.2119
13-05 Tick Tock	7.8119	7.6607	0.1512
13-06 Too Close For Comfort	6.5666	6.7190	-0.1524
18-03 We Play Games	6.0180	5.7255	0.2925
18-05 No Need To Believe In Either Side	7.0033	6.3025	0.7008
18-07 Someone Is Always Willing To Pay	6.2186	5.9194	0.2992
18-08 The Condor	5.0887	4.6330	0.4557
18-09 I Miss That Kind of Clarity	7.9523	7.4792	0.4731
19-01 HI-Jinx	7.3639	7.2165	0.1474
19-02 HI-Way Robbery	6.8682	6.8101	0.0581
19-04 HI Cost of Living	7.4355	7.6501	-0.2146
20-01 Wish You Were Here	5.7448	5.6126	0.1322
20-02 Deja Vu	8.1171	7.8257	0.2914
20-03 Deja Vu All Over Again	6.6615	7.8361	-1.1746
21-01 8 x 3 Trigger Freeze	10.4360	10.3999	0.0361
22-01 Righty Tighty	6.6600	6.2710	0.3890
22-02 Lefty Loosey	6.3608	6.0784	0.2824
22-04 Calm Before the Storm	8.2006	7.8844	0.3162

Table 5: Revolver Division (Continued)			
Classifier	**Rec. HHF**	**Old HHF**	**Change**
22-06 Blues Don't Care	9.8151	10.8000	-0.9849
22-07 Cross Road Blues	6.9661	6.8000	0.1661
23-01 THS Short Course	7.1461	6.9995	0.1466
23-02 This could be the Greatest Night of Our Lives	8.6939	8.1721	0.5218
24-01 Can you Strong and Weak Hand?	8.2044	8.4377	-0.2333
24-02 This is more better now	6.7590	6.2526	0.5064
24-04 The Thrill of the Bill Drill	7.4871	7.9594	-0.4723
24-06 Surely you can't be serious	5.9393	6.7121	-0.7728
24-08 And now for something completely different	6.7558	7.7138	-0.9580
24-09 Tres Cajas	6.8147	7.0448	-0.2301

Table 6: Single Stack Division

Classifier	**Rec. HHF**	**Old HHF**	**Change**
99-08 Melody Line	8.8712	9.9094	-1.0382
99-10 Times Two	8.8809	9.5586	-0.6777
99-11 El Presidente	9.9873	11.3537	-1.3664
99-12 Take Your Choice	8.2333	9.4671	-1.2338
99-13 Quicky II	7.8627	9.2418	-1.3791
99-19 Paynes Pain	5.6807	6.2840	-0.6033
99-28 Hillbillton Drill	9.2292	9.7539	-0.5247
99-42 Fast n Furious	8.5122	9.1374	-0.6252
99-46 Close Quarter Standards	8.5748	9.6481	-1.0733
99-53 Triple Play	6.6368	6.8431	-0.2063
99-57 Bookouts Boogie	6.1842	6.7545	-0.5703
99-62 Bang and Clang	10.8877	12.2784	-1.3907
03-03 Take em Down	7.5389	7.6226	-0.0837
03-05 Paper Poppers	9.1892	10.3120	-1.1228
03-07 Riverdale Standards	6.5169	7.5451	-1.0282
03-08 Madness	8.7761	9.4285	-0.6524
03-09 On the Move	9.5790	11.0280	-1.4490
03-18 High Standards	7.1757	8.3423	-1.1666
06-03 Can You Count	14.0966	14.9224	-0.8258
06-04 Fluffy's Revenge 1	13.0752	13.7410	-0.6658
06-05 Fluffy's Revenge 2	11.7664	13.3461	-1.5797
06-10 Steely Speed VII	8.0498	9.4410	-1.3912
08-02 Steeler Standards	6.6033	6.5293	0.0740
08-03 Six	9.9296	10.8096	-0.8800
09-10 Life's Little Problems	9.8766	10.1504	-0.2738
13-02 Down The Middle	11.0609	11.7379	-0.6770
13-04 The Roscoe Rattle	11.8149	11.9603	-0.1454
13-05 Tick Tock	9.7767	10.6825	-0.9058
13-06 Too Close For Comfort	8.4155	8.9181	-0.5026
18-03 We Play Games	7.5886	7.6840	-0.0954

Table 6: Single Stack Division (Continued)			
Classifier	**Rec. HHF**	**Old HHF**	**Change**
18-05 No Need To Believe In Either Side	8.7281	8.3364	0.3917
18-07 Someone Is Always Willing To Pay	8.1307	8.6418	-0.5111
18-08 The Condor	5.9229	5.6264	0.2965
18-09 I Miss That Kind of Clarity	9.8039	9.8004	0.0035
19-01 HI-Jinx	8.8474	8.7378	0.1096
19-02 HI-Way Robbery	8.5759	8.5558	0.0201
19-04 HI Cost of Living	9.4492	9.4496	-0.0004
20-01 Wish You Were Here	6.9487	7.2283	-0.2796
20-02 Deja Vu	10.1470	10.2674	-0.1204
20-03 Deja Vu All Over Again	8.2215	9.3310	-1.1095
21-01 8 x 3 Trigger Freeze	13.3487	13.7999	-0.4512
22-01 Righty Tighty	8.0243	7.8926	0.1317
22-02 Lefty Loosey	7.7577	7.6899	0.0678
22-04 Calm Before the Storm	10.1448	10.2434	-0.0986
22-06 Blues Don't Care	11.5577	12.3000	-0.7423
22-07 Cross Road Blues	7.8134	7.1570	0.6564
23-01 THS Short Course	8.5915	8.2758	0.3157
23-02 This could be the Greatest Night of Our Lives	10.1621	9.2764	0.8857
24-01 Can you Strong and Weak Hand?	9.9424	8.9329	1.0095
24-02 This is more better now	7.6699	8.0350	-0.3651
24-04 The Thrill of the Bill Drill	9.1730	10.2326	-1.0596
24-06 Surely you can't be serious	7.5102	9.9905	-2.4803
24-08 And now for something completely different	8.8833	10.3078	-1.4245
24-09 Tres Cajas	9.0835	9.5797	-0.4962

Table 7: Carry Optics Division

Classifier	**Rec. HHF**	**Old HHF**	**Change**
99-08 Melody Line	9.1872	9.6721	-0.4849
99-10 Times Two	9.5108	9.6530	-0.1422
99-11 El Presidente	10.3391	11.6423	-1.3032
99-12 Take Your Choice	8.8556	9.4725	-0.6169
99-13 Quicky II	7.8905	8.9461	-1.0556
99-19 Paynes Pain	6.2113	6.5106	-0.2993
99-28 Hillbillton Drill	9.7171	10.4252	-0.7081
99-42 Fast n Furious	9.1863	8.8111	0.3752
99-46 Close Quarter Standards	8.3850	9.4941	-1.1091
99-53 Triple Play	7.1774	7.0137	0.1637
99-57 Bookouts Boogie	7.7800	7.4051	0.3749
99-62 Bang and Clang	11.6369	12.7237	-1.0868
03-03 Take em Down	8.2443	8.2842	-0.0399
03-05 Paper Poppers	9.6596	10.1437	-0.4841
03-07 Riverdale Standards	6.6295	7.1572	-0.5277
03-08 Madness	9.5578	9.6707	-0.1129

Table 7: Carry Optics Division (Continued)			
Classifier	**Rec. HHF**	**Old HHF**	**Change**
03-09 On the Move	10.3664	11.2743	-0.9079
03-18 High Standards	7.5910	7.9574	-0.3664
06-03 Can You Count	14.8293	15.9889	-1.1596
06-04 Fluffy's Revenge 1	13.9180	14.5282	-0.6102
06-05 Fluffy's Revenge 2	12.3899	13.4141	-1.0242
06-10 Steely Speed VII	9.5992	9.9430	-0.3438
08-02 Steeler Standards	6.4628	6.9370	-0.4742
08-03 Six	10.6658	11.2794	-0.6136
09-10 Life's Little Problems	11.5703	11.1656	0.4047
13-02 Down The Middle	12.9227	13.2613	-0.3386
13-04 The Roscoe Rattle	12.1657	12.4795	-0.3138
13-05 Tick Tock	10.4226	10.7797	-0.3571
13-06 Too Close For Comfort	8.4887	9.2398	-0.7511
18-03 We Play Games	7.1931	7.4753	-0.2822
18-05 No Need To Believe In Either Side	9.3661	9.8129	-0.4468
18-07 Someone Is Always Willing To Pay	8.4808	9.0838	-0.6030
18-08 The Condor	6.1239	6.0928	0.0311
18-09 I Miss That Kind of Clarity	9.8081	10.1540	-0.3459
19-01 HI-Jinx	9.4976	9.7999	-0.3023
19-02 HI-Way Robbery	9.7586	9.8930	-0.1344
19-04 HI Cost of Living	9.8287	10.2496	-0.4209
20-01 Wish You Were Here	8.3266	8.5679	-0.2413
20-02 Deja Vu	11.5162	11.2622	0.2540
20-03 Deja Vu All Over Again	10.2338	11.0380	-0.8042
21-01 8 x 3 Trigger Freeze	14.8079	16.0000	-1.1921
22-01 Righty Tighty	8.4433	8.6663	-0.2230
22-02 Lefty Loosey	7.6202	8.0000	-0.3798
22-04 Calm Before the Storm	10.4061	10.7500	-0.3439
22-06 Blues Don't Care	12.3638	12.5000	-0.1362
22-07 Cross Road Blues	9.0749	9.7140	-0.6391
23-01 THS Short Course	10.4870	9.6123	0.8747
23-02 This could be the Greatest Night of Our Lives	10.7470	10.2284	0.5186
24-01 Can you Strong and Weak Hand?	10.8586	12.2500	-1.3914
24-02 This is more better now	9.6515	13.0890	-3.4375
24-04 The Thrill of the Bill Drill	9.4176	12.2000	-2.7824
24-06 Surely you can't be serious	11.0953	13.4883	-2.3930
24-08 And now for something completely different	10.6907	12.4033	-1.7126
24-09 Tres Cajas	10.4636	12.1488	-1.6852

Table 8: PCC Division

Classifier	**Rec. HHF**	**Old HHF**	**Change**
99-08 Melody Line	10.2665	10.6010	-0.3345
99-10 Times Two	11.1087	10.9507	0.1580

Table 8: PCC Division (Continued)			
Classifier	**Rec. HHF**	**Old HHF**	**Change**
99-11 El Presidente	12.6276	14.0093	-1.3817
99-12 Take Your Choice	9.6315	9.1194	0.5121
99-13 Quicky II	11.4460	11.3569	0.0891
99-19 Paynes Pain	5.6574	5.8973	-0.2399
99-28 Hillbillton Drill	11.2029	11.3885	-0.1856
99-42 Fast n Furious	9.7524	9.2445	0.5079
99-46 Close Quarter Standards	12.3707	11.9748	0.3959
99-53 Triple Play	7.4067	6.8613	0.5454
99-57 Bookouts Boogie	8.4614	8.3106	0.1508
99-62 Bang and Clang	15.4212	16.6102	-1.1890
03-03 Take em Down	8.7401	8.5864	0.1537
03-05 Paper Poppers	11.1600	11.1348	0.0252
03-07 Riverdale Standards	8.8285	8.9564	-0.1279
03-08 Madness	10.0547	10.6643	-0.6096
03-09 On the Move	12.0917	13.4224	-1.3307
03-18 High Standards	10.6184	11.1314	-0.5130
06-03 Can You Count	16.2169	16.5673	-0.3504
06-04 Fluffy's Revenge 1	16.5898	17.4643	-0.8745
06-05 Fluffy's Revenge 2	16.7873	17.3088	-0.5215
06-10 Steely Speed VII	12.0400	13.1539	-1.1139
08-02 Steeler Standards	8.3512	8.2140	0.1372
08-03 Six	14.2458	14.4461	-0.2003
09-10 Life's Little Problems	12.1018	11.0988	1.0030
13-02 Down The Middle	16.5978	16.6066	-0.0088
13-04 The Roscoe Rattle	16.3487	16.3099	0.0388
13-05 Tick Tock	10.7925	11.4003	-0.6078
13-06 Too Close For Comfort	8.8563	9.5673	-0.7110
18-03 We Play Games	8.7976	8.9519	-0.1543
18-05 No Need To Believe In Either Side	10.8634	11.4744	-0.6110
18-07 Someone Is Always Willing To Pay	9.7127	10.4750	-0.7623
18-08 The Condor	6.6349	6.7137	-0.0788
18-09 I Miss That Kind of Clarity	10.4337	10.8152	-0.3815
19-01 HI-Jinx	10.9518	11.8567	-0.9049
19-02 HI-Way Robbery	10.5852	10.8388	-0.2536
19-04 HI Cost of Living	10.4266	10.4452	-0.0186
20-01 Wish You Were Here	8.6602	8.7000	-0.0398
20-02 Deja Vu	12.6515	12.0366	0.6149
20-03 Deja Vu All Over Again	10.9920	11.0000	-0.0080
21-01 8 x 3 Trigger Freeze	16.6464	16.2999	0.3465
22-01 Righty Tighty	9.8826	9.0520	0.8306
22-02 Lefty Loosey	9.0787	8.6137	0.4650
22-04 Calm Before the Storm	11.4915	10.6399	0.8516
22-06 Blues Don't Care	15.8662	16.4382	-0.5720
22-07 Cross Road Blues	9.5938	9.5071	0.0867
23-01 THS Short Course	10.7982	10.0381	0.7601

Table 8: PCC Division (Continued)			
Classifier	**Rec. HHF**	**Old HHF**	**Change**
23-02 This could be the Greatest Night of Our Lives	11.8749	10.6849	1.1900
24-01 Can you Strong and Weak Hand?	11.7189	11.4152	0.3037
24-02 This is more better now	10.1819	10.0883	0.0936
24-04 The Thrill of the Bill Drill	11.5200	14.3542	-2.8342
24-06 Surely you can't be serious	11.8618	11.0688	0.7930
24-08 And now for something completely different	13.0223	13.4093	-0.3870
24-09 Tres Cajas	11.5656	12.2027	-0.6371

Table 9: Limited Optics Division

Classifier	**Rec. HHF**	**Old HHF**	**Change**
99-08 Melody Line	9.1990	10.2867	-1.0877
99-10 Times Two	9.6792	10.3143	-0.6351
99-11 El Presidente	10.5956	12.0965	-1.5009
99-12 Take Your Choice	8.9675	10.1472	-1.1797
99-13 Quicky II	7.9572	9.5617	-1.6045
99-19 Paynes Pain	6.4275	6.9082	-0.4807
99-28 Hillbillton Drill	9.8941	10.8761	-0.9820
99-42 Fast n Furious	9.6434	9.7240	-0.0806
99-46 Close Quarter Standards	8.5262	9.9734	-1.4472
99-53 Triple Play	7.3626	7.3228	0.0398
99-57 Bookouts Boogie	8.0864	7.8230	0.2634
99-62 Bang and Clang	12.1807	13.1828	-1.0021
03-03 Take em Down	8.3794	8.6370	-0.2576
03-05 Paper Poppers	9.6841	10.4705	-0.7864
03-07 Riverdale Standards	6.6295	7.5347	-0.9052
03-08 Madness	9.5797	10.3336	-0.7539
03-09 On the Move	10.6062	11.7487	-1.1425
03-18 High Standards	7.5910	8.3644	-0.7734
06-03 Can You Count	15.1357	16.3146	-1.1789
06-04 Fluffy's Revenge 1	14.2579	14.9159	-0.6580
06-05 Fluffy's Revenge 2	12.5110	13.7764	-1.2654
06-10 Steely Speed VII	9.8694	10.4053	-0.5359
08-02 Steeler Standards	6.4628	7.1598	-0.6970
08-03 Six	10.7857	11.3943	-0.6086
09-10 Life's Little Problems	11.8718	11.6890	0.1828
13-02 Down The Middle	13.1483	13.7515	-0.6032
13-04 The Roscoe Rattle	12.1661	12.8820	-0.7159
13-05 Tick Tock	11.0382	11.1853	-0.1471
13-06 Too Close For Comfort	8.7345	9.5827	-0.8482
18-03 We Play Games	7.1931	7.7773	-0.5842
18-05 No Need To Believe In Either Side	9.3661	10.0722	-0.7061
18-07 Someone Is Always Willing To Pay	8.6889	9.2589	-0.5700
18-08 The Condor	6.1239	6.2907	-0.1668

Table 9: Limited Optics Division (Continued)			
Classifier	**Rec. HHF**	**Old HHF**	**Change**
18-09 I Miss That Kind of Clarity	9.8631	10.4087	-0.5456
19-01 HI-Jinx	9.8182	10.4810	-0.6628
19-02 HI-Way Robbery	9.7586	10.1259	-0.3673
19-04 HI Cost of Living	9.9605	10.4829	-0.5224
20-01 Wish You Were Here	8.3384	8.7775	-0.4391
20-02 Deja Vu	11.7386	12.0092	-0.2706
20-03 Deja Vu All Over Again	10.2338	11.0576	-0.8238
21-01 8 x 3 Trigger Freeze	14.9063	16.3791	-1.4728
22-01 Righty Tighty	8.5411	8.5512	-0.0101
22-02 Lefty Loosey	7.6366	7.9461	-0.3095
22-04 Calm Before the Storm	10.8522	10.8216	0.0306
22-06 Blues Don't Care	12.3901	12.5519	-0.1618
22-07 Cross Road Blues	9.1462	9.7560	-0.6098
23-01 THS Short Course	10.4870	9.6123	0.8747
23-02 This could be the Greatest Night of Our Lives	10.7470	10.2284	0.5186
24-01 Can you Strong and Weak Hand?	10.8972	12.2520	-1.3548
24-02 This is more better now	9.6515	13.1000	-3.4485
24-04 The Thrill of the Bill Drill	9.4176	12.2474	-2.8298
24-06 Surely you can't be serious	11.0953	13.6038	-2.5085
24-08 And now for something completely different	10.6907	12.3529	-1.6622
24-09 Tres Cajas	10.4636	12.3214	-1.8578

Appendix C: Example Classification in Old vs New System

Old Classification System: 97.1629%

Date	Number	F	Percent	HF	Source
8/26/23	09-13	D	91.3552	7.3826	Stage Score
6/09/23		Y	99.3216	-	Major Match
5/13/23	06-10	Y	100.0000	10.1010	Stage Score
5/13/23	06-10	C	83.5784	8.3102	Stage Score
5/06/23	99-24	Y	100.0000	11.6232	Stage Score
10/01/22	99-23	B	78.6906	10.0971	Stage Score
10/01/22	99-23	B	73.3731	9.4148	Stage Score
8/26/22	09-13	Y	96.8916	7.8300	Stage Score
7/23/22	03-04	B	23.0383	2.1771	Stage Score
6/02/22		B	78.5540	-	Major Match
5/07/22	18-03	F	90.2024	6.7429	Stage Score
3/05/22	03-18	F	88.9424	7.0775	Stage Score
2/12/22	09-13	B	54.3161	4.3750	Stage Score
2/05/22	09-14	C	83.2721	7.2022	Stage Score
1/15/22	20-01	Y	96.2167	8.0620	Stage Score
1/02/22	18-08	C	83.4345	5.0835	Stage Score
1/02/22	19-01	C	83.2315	8.1566	Stage Score
1/02/22	21-01	B	77.6669	12.4267	Stage Score
1/02/22	19-03	B	63.3006	5.6630	Stage Score
1/02/22	03-09	B	48.7268	5.4936	Stage Score
11/13/21	18-07	C	81.8273	7.0896	Stage Score
11/06/21	99-08	Y	90.5475	8.5044	Stage Score

New Classification System: 94.2987%

Date	Number	F	Percent	HF	Source
8/26/23	09-13	Y	86.2012	7.3826	Stage Score
6/09/23		Y	99.3216	-	Major Match
5/13/23	06-10	Y	95.9750	10.1010	Stage Score
				8.3102	Stage Score
5/06/23	99-24	Y	106.7403	11.6232	Stage Score
10/01/22	99-23	Y	83.8121	10.0971	Stage Score
				9.4148	Stage Score
8/26/22	09-13	D	91.4216	7.8300	Stage Score
7/23/22	03-04	F	22.7883	2.1771	Stage Score
6/02/22		F	78.5540	-	Major Match
5/07/22	18-03	Y	93.7424	6.7429	Stage Score
3/05/22	03-18	F	88.9424	7.0775	Stage Score
2/12/22	09-13	F	54.3161	4.3750	Stage Score
2/05/22	09-14	F	83.2721	7.2022	Stage Score
1/15/22	20-01	F	96.2167	8.0620	Stage Score
1/02/22	18-08	F	83.4345	5.0835	Stage Score
1/02/22	19-01	F	83.2315	8.1566	Stage Score
1/02/22	21-01	F	77.6669	12.4267	Stage Score
1/02/22	19-03	F	63.3006	5.6630	Stage Score
1/02/22	03-09	F	48.7268	5.4936	Stage Score
11/13/21	18-07	F	81.8273	7.0896	Stage Score
11/06/21	99-08	F	90.5475	8.5044	Stage Score

Figure 10: Classification Record & Calculation Comparison

Appendix D: Frequently Asked Questions

High Hit Factors

- **What was the problem with 23- and 24-series classifiers?**

◦ The 23- and 24-series had poorly calibrated HHFs, resulting in higher classification percentages for the 23-series and lower for the 24-series. You can see the differences between Recommended and Current (pre-update) HHFs and historical scores on HitFactor.Info. For example, nobody achieved GM scores on the 24-series in the Carry Optics division.

- **What's the difference between percentile & percentage, and how are the classification brackets affected?**

◦ A percentile shows how a score compares to others by sorting all the scores from lowest to highest and then seeing what percentage of scores are below it. For example, if your score is in the 90th percentile (or top 10% of scores), you've shot the classifier better than 90% of other shooters.

We only use percentile numbers to determine the HHF, which is then used to calculate a percentage, which is then used to determine your classification, using the same class brackets (95% for GM, 85% M, 75% A, 60% B, 40% C) as before.

- **How often will the Classification System and HHFs be updated?**

◦ After this update, we do not plan to change the core algorithm of the Classification System further. Still, we will review and issue updated HHFs at least semi-annually.

- **How do HHFs change over time, and how does the new system address the "shot out" classifiers?**

◦ The term "shot out"—referring to a classifier with an unobtainably high HHF caused by many top shooters consistently exceeding the initial HHF—is statistically incorrect. Unrealistic HHFs result from flawed calculation methods, not the number of scores on file.

In fact, with a new method, more scores only smooth the distribution and make the HHF slightly more manageable and stable. This is possible due to the nature of the Weibull distribution, as top scores don't have as much of an effect on the HHFs as before.

- **What measures are in place to prevent future miscalibration of classifiers' HHFs?**

◦ Previous issues with HHFs have all stemmed from suboptimal (and often different between the series) methods of calculating them. With the new system, all classifiers use the same methodology and calibration targets, resulting in equal difficulty levels. Additionally, we're using new and improved metrics to review outliers and invalid scores.

- **How does the new Classification System address the differences between the divisions?**

◦ Unless special consideration is applied to the division (e.g., Limited Optics using Carry Optics HHFs due to their similarity and thus score compatibility), division HHFs are only calculated from that division scores. The "equal difficulty" between the divisions is relative and achieved through similar percentile/percent targeting while using only division-specific score distribution.

- **I shot a classifier in Limited-10, and now it has an "I" flag on my record. What does it mean?**

◦ Limited-10 classifiers will be flagged "I" until the provisional period ends, at which point new HHFs will be applied, and they will become current.

- **Why are Limited-10 classifiers still in a provisional period?**

◦ From the Classification System point of view, Limited-10 is an entirely new division and doesn't have any other divisions that are compatible with it. Because of that, we need to completely restart the data collection and HHFs calibration for the Limited-10 division.

Classifier List Reduction

- **Why were certain classifiers retired?**

◦ The initial reason for reducing the classifier list is that we have too many classifier/division combinations (900 total), which makes data collection challenging, especially for less popular divisions.

Using the new Quality Score, we were able to determine which classifiers are doing a poor job determining shooters' classifications, like Fixed Time in the PCC division, for example, which was much easier to get high scores on.

- **How do you ensure that the remaining classifiers are representative of all skills and modern style stages?**

◦ Major Match Performance correlation is the main component of the new Quality Score. Still, we've also manually reviewed the remaining classifiers, ensuring that they include all previously tested skills and are compatible with smaller indoor bays and lower-capacity divisions.

- **Are low capacity (10 round restricted) states going to have compatible classifiers available to them in the reduced list?**

◦ Yes, 35 of the classifier stages are 10 round compatible, and of those, 20 are friendly to common indoor bay restrictions.

- **Will new classifiers be introduced, and if so, how will they be evaluated?**

◦ This update doesn't include any new classifiers, but we're working on it and will utilize the same methodology for the quality and HHF analysis.

- **Is there a recommended list of classifiers?**

◦ All remaining classifiers, listed in Appendix B, are current and are good to use in matches.

Classification Algorithm

- **Why are you changing the flag logic?**

◦ We are removing the B and C flags because they serve no purpose anymore with properly calibrated HHFs and only reduce the precision of the Classification System. We're changing the D flag logic to discourage unsafe "Hero-or-Zero" strategies and reduce the gaming of the Classification System (a practice known as "Grandbagging"). We're also removing the G flag since it can be used as a replacement for B/C and offer protection against low scores through deliberate zeroing of the stage.

- **Will the classifiers that determine our current percentage change? What happens to scores already flagged as B, C, or G?**

◦ Scores that have already been flagged and assigned a percentage will remain unchanged, even if they still fall within the most recent eight on record. The updated HHFs and flagging logic will only apply to scores uploaded after the change.

- **Why was the 110% score ceiling introduced?**

- To improve the correlation between classification and Major Match Performance of top shooters.

- **Is the New Classification System more difficult than before? Will my current percentage drop?**
- The New Classification System was carefully calibrated to maintain the same overall difficulty level as the current system for the Carry Optics division. This ensures that classification letters still represent the same relative level of performance, and the number of Grandmasters remains unchanged. Most shooters will see a slight increase in their classification percentage. While the updated flag logic requires consistent performance, most HHFs have been lowered, making them more attainable when shooting a classifier at your actual skill level rather than relying on a "Hero-or-Zero" approach.

- **How will this affect existing classifications? Can I be reclassified to a lower class under the new system?**
- There will be no retroactive reclassifications, and your current classification letters and high percentages will remain unchanged. High percentages can only increase during weekly reclassifications, and existing classification letters will never be downgraded.

- **How did you address different ways of gaming the classification system?**
- The new system effectively eliminates the problems of "Grandbagging" and unintentional "Sandbagging" and heavily discourages "Hero-or-Zero" strategies. However, intentional "Sandbagging" is still possible, and we're working on addressing it soon by updating the Major Match classification procedures and Match Bump logic.

- **Can I still reshoot classifiers to get a higher classification?**
- The rules on the legality of paid classifier reshoots are outside of the scope of the USPSA Classifier Committee and have not changed, so you can still reshoot classifiers like before. With the D flag logic changes, classifier reshoots will not carry the same weight they previously could.

- **Why are same-day duplicates averaged into a single score, but next-day duplicates are not?**
- Analysis of historical scores revealed that same-day reshoots consistently yield significantly higher scores, especially when using the "Hero-or-Zero" strategy—intentionally relying on reshoots to achieve a peak score. This created a potential for inflated classifications. Because of that, additional logic was introduced to prioritize consistency over isolated peak scores resulting from paid reshoots.

- **If I don't like my score, can I deliberately zero it to avoid hurting my classification percentage?**
- With the B, C, and G flags removed, the USPSA Classification System no longer offers protection against low scores. You can zero it, but it will still count. Remember that inside of your eight-score window, two scores are not factored into your classification percentage calculation.

- **What if I don't shoot the match, but the Match Director still uploads my score as a zero? Will it count?**
- DNFs and scores with no shots recorded will be excluded and will not count.

- **How many classifiers do I need to fully reclassify under the new system?**
- Between six and eight, depending on whether your F flags are from new or old scores.